

III. Remarks

Reconsideration and re-examination of this application in view of the above amendments and the following remarks is herein respectfully requested. Claims 1, 14, 15, 16, and 17 have been amended.

After entering this amendment, claims 1, 5-7, and 9-17 remain pending.

Specification

The specification was objected to for failing to identify appropriate sections and to distinguish features of the invention from features of the prior art. As suggested in the Office Action, the specification has been amended to add section headings to remove any confusion. As such, it is believed that these objections are not moot and should be withdrawn.

Drawings

The drawings were objected to for not showing all the features of claim 1. However, the Office Action failed to state which specific features were missing. The undersigned believes that the drawings and specification provide adequate support for all features claimed. As such, this objection is improper for lack of clarity and should be withdrawn.

Claim Rejections – 35 U.S.C. § 101

Claims 1-7 and 9-13 were rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. Claims 1 to 7 and 9 to 13 were rejected because the claimed invention is directed to non-statutory subject matter.

Claim 1 and corresponding computer program product claim 16 have been amended to now explicitly state that all method steps are carried out by a computer as suggested by the Examiner. As such, it is believed that this rejection is now moot and should be withdrawn.

Claim Rejections - 35 U.S.C. §103(a)

Claims 1, 4-6, 9-12, and 14-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,301,687 to Jain, et al. ("Jain '687") in view of U.S. Patent No. 6,484,292 to Jain, et al. ("Jain '292"). Claims 2, 3, and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jain '687 in view of Jain '292 and further in view of U.S. Patent No. 6,993,730 to Higgins, et al. ("Higgins").

More specifically, the Examiner states that Jain '687 teaches step (a) determining for at least one specific circuit structure described by the reference description of the digital circuit... an implementation alternative that has the greatest degree of structural equivalence... and in step (b) replacing in the reference description of the digital circuit, the description of the individual circuit structure is replaced by the implementation alternative determined for the respective circuit structure in step (a) with the greatest degree of structure equivalence. The Examiner states that this is disclosed by "different implementations of the same design are compared to check their equivalence, column 1, lines 45 to 60 of Jain '687 which results in the implementation with the greatest degree of equivalence been chosen or pointed out". The applicant respectfully disagrees.

Jain ('687) discloses that different implementations of the same design are compared to check their equivalence (column 1, lines 51 to 53). However, Jain '687

does not teach the determination of the greatest structural equivalence. According to Jain '687, the first implementation is compared against the original specification. If this verification has been successful, the first implementation becomes the specification for the next implementation (column 1, lines 57 to 59). The original specification is deleted and not considered in any further step. Then, the second implementation is compared to the first implementation. However, the second implementation will not be compared to the original specification. The method of Jain can therefore not determine which one of the first implementation or second implementation has a higher degree of structural equivalence.

In case the first verification step has been successful, one may know that the original specification is functionally equivalent to the first implementation. However, verification does not give an information whether the structural equivalent of the first implementation and the original specification have a higher or lower equivalence with respect to the second implementation because a standard equivalence check (as applied by Jain) only results in an answer yes (equivalent) or no (not equivalent). For example, the equivalence comparison between the first implementation and the original specification may result in a successful verification although the structural equivalence between the original specification and the second implementation may be higher than the structural equivalence between the first implementation and the second implementation because when first implementation is verified against the original description, there is no knowledge about the structure of the second implementation alternative known.

Therefore the method of Jain (687) does not disclose determining the implementation alternative with the highest degree of structural equivalence as claimed in the presently amended independent claims. The present invention claims

that the highest degree of structural equivalence is determined and consequently the implementation alternative with the highest structural equivalence is selected from a plurality of predefined implementation alternatives.

Furthermore the Examiner states that Jain '292 teaches a plurality of different predefined implementation alternatives (Figure 4 initial implementation and new design matches, i.e. several different predefined implementations that are read). The applicant respectfully disagrees.

Figure 4 of Jain '292 teaches that one implementation C0 is read in step 262 (Figure 4 and column 4, lines 40 to 41) and that a new design specification Sn is read in step 264 (column 4, lines 40 to 41). Thus there is a single implementation and a single specification which are used for comparison in Jain '292. Then output ports (POs) of Sn are selected (step 268). A check is performed, whether corresponding Pos in the implementation C0 are present or if they have to be generated. Jain '292 does not teach a plurality of different predefined implementation alternatives which may be selected. Instead only one single implementation C0 is used. The applicant therefore assumes that the independent claims are new and inventive over Jain '687 in view of Jain '292.

Additionally, the independent claims 1, and 14 to 17 have been amended by inserting that the at least one specific circuit structure of which the first implementation alternative with the greatest degree of equivalence is determined in each case are multiplier structures for realising integral multiplication functions. This corresponds to original filed claims 2 and 3. Correspondingly claims 2, 3 and 4 have been deleted. None of the Jain documents describe that the specific circuits and structures having the greatest degree of equivalence are multiplier structures for realising integral multiplication functions.

The Examiner has rejected claims 2, 3 and 7 as being unpatentable over Jain et al. (US 6,391,687) in view of Jain et al. (US 6,484,292) in further view of Higgins et al. (6,993,730) as Higgins teaches wherein the specific circuits structures for which the implementation alternative with the greatest degree of equivalence is determined in each case are multiplier structures for realizing integral multiplication functions.

Higgins discloses that predetermined equivalence information may be used, such as equivalence between an nxm bit multiplier and a gate-level Booth multiplier circuit (col. 12, lines 29-31). Further, the selection of a multiplier structure is based on a so called net numbers (col. 12, line 37). In contrast, the present invention claims that the implementation alternative of the greatest degree of structural equivalence is a multiplier structure for realizing integral multiplication functions. This is not disclosed in Higgins. The applicant therefore assumes that the claims are novel in respect of Higgins and the Jain documents.

As to the remaining claims, these claims are dependent on the independent claims and should be allowable for at least the same reasons given above. Allowance of these claims is respectfully requested.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

Respectfully submitted,

February 5, 2010
Date

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Attachment: None